COSEWIC
Assessment and Update Status Report

on the

Athabasca Thrift
Armeria maritima ssp. *interior*

in Canada

SPECIAL CONCERN
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE IN
CANADA

COSEPAC
COMITÉ SUR LA SITUATION DES
ESPÈCES EN PÉRIL
AU CANADA

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Previous Report

Argus. G.W. 1981. COSEWIC status report on the Athabasca thrift *Armeria maritima* subsp. *Interior* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 26 pp.

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COSEWIC
Assessment Summary

Assessment Summary – May 2002

Common name
Athabasca thrift

Scientific name
Armeria maritima ssp. *interior*

Status
Special Concern

Reason for designation
A Canadian endemic occurring sparsely within a unique sand dune ecosystem of limited geographical extent supporting at least 10 endemic plant species with various threats indicated.

Occurrence
Saskatchewan

Status history
Designated Threatened in April 1981. Status re-examined and downlisted to Special Concern in April 1999. Status re-examined and confirmed Special Concern in May 2002. Last assessment was based on an existing status report.

COSEWIC
Executive Summary

Athbasca Thrift
Armeria maritima ssp. *interior*

Species information

Athabasca thrift is a perennial herb with a taproot and a branched woody base from which arise one to several rosettes of flat linear leaves. An erect flowering stem, to 25 cm in height, develops from the centre of each rosette. The small pink flowers are borne in a dense, nearly spherical head. The flowers are subtended by two sets of scarious bracts; the calyx tube is hairless and distinctly lobed.

Distribution

This subspecies of a wide-ranging species is known only from the south shore of Lake Athabasca, Saskatchewan, where it occurs in the three large dune fields: (1) the William River Dunes located between Ennuyeuse Cr. and the William River, (2) the Thomson Bay Dunes located between William River and Cantara Lake, and (3) the MacFarlane River Dunes, located just west of the MacFarlane River and in the smaller dunes at Archibald Lake.

Habitat

Athabasca thrift is restricted to dune slacks and gravel barrens.

Biology

Little is known about the specific biology of this subspecies. Seedlings become established both on gravel pavements and on moist to wet dune slacks. Plants growing in dune slacks are young, vigorous plants that eventually become covered by the shifting sand. Old plants are found only on the relatively stable gravel pavements.

Population sizes and trends

The population of this subspecies is very small, but its exact size and trends cannot be estimated without quantitative data. This subspecies occurs only as small populations or as occasional individuals. Its main habitats, which are gravel pavements, are themselves relatively uncommon and the vegetation on them is very sparse. Species growing on these gravel pavements, therefore, are among the least common

species in the Athabasca sand dunes. This subspecies is thought to be one of the most uncommon of the endemics in the sand dunes. There are only eighteen herbarium collections of this taxon.

Limiting factors and threats

All-terrain vehicle use for recreational activities has been identified as a threat to the sand dunes and their endemics. Other potential threats may arise from future pressures for mining exploration. Increased visitor use may pose some threats, although such recreational activities, especially from canoeists may be restricted to areas of water access.

Special significance of the species

The subspecies is mainly notable for its restricted range as a Canadian endemic.

Existing protection or other status designations

The main protection of this subspecies comes from its occurrence in the Athabasca Sand Dunes Wilderness Provincial Park.

Summary of status report

Athabasca thrift is one of ten endemic vascular plants known from the Lake Athabasca sand dune region of northwestern Saskatchewan. It is one of the most uncommon endemics in the Athabasca sand dunes. Its habitat is localized and fragile. Although the Athabasca sand dunes enjoy Provincial Wilderness Park protection there is reason to believe that pressures from mining and tourism will require continued vigilance.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.
** Formerly described as "Not In Any Category", or "No Designation Required."
*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.

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Update
COSEWIC Status Report

on the

Athabasca Thrift
Armeria maritima ssp. *interior*

in Canada

George W. Argus[1]

1999

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SPECIES INFORMATION

Name and classification

Scientific name:	*Armeria maritima* (Mill.) Willd. ssp. *interior* (Raup) Porsild
Holotype:	Vicinity of William Pt., Lake Athabasca. Sand dune country about 5 mi (8 km) south of the point. H.M. Raup 6895 (Gray Herbarium)
Synonym:	Statice interior Raup
Common name:	Athabasca thrift
Family:	Plumbaginaceae (leadwort family)
Major plant group:	dicot flowering plant

Description

Athabasca thrift is a perennial herb with a tap root and a branched woody base from which arise one to several rosettes of flat linear leaves. An erect flowering stem, to 25 cm in height, develops from the centre of each rosette. The small pink flowers are borne in a dense, nearly spherical head. The flowers are subtended by two sets of scarious bracts; the calyx tube is hairless and distinctly lobed.

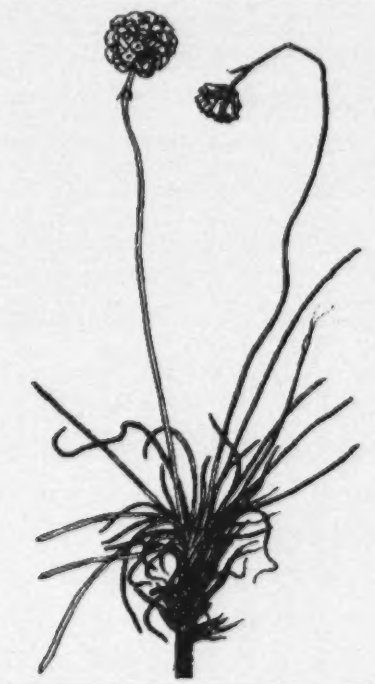

Figure 1. Athabasca thrift (courtesy of Canadian Museum of Nature).

DISTRIBUTION

Global range

This subspecies is a Canadian endemic of the Athabasca Sand Dunes.

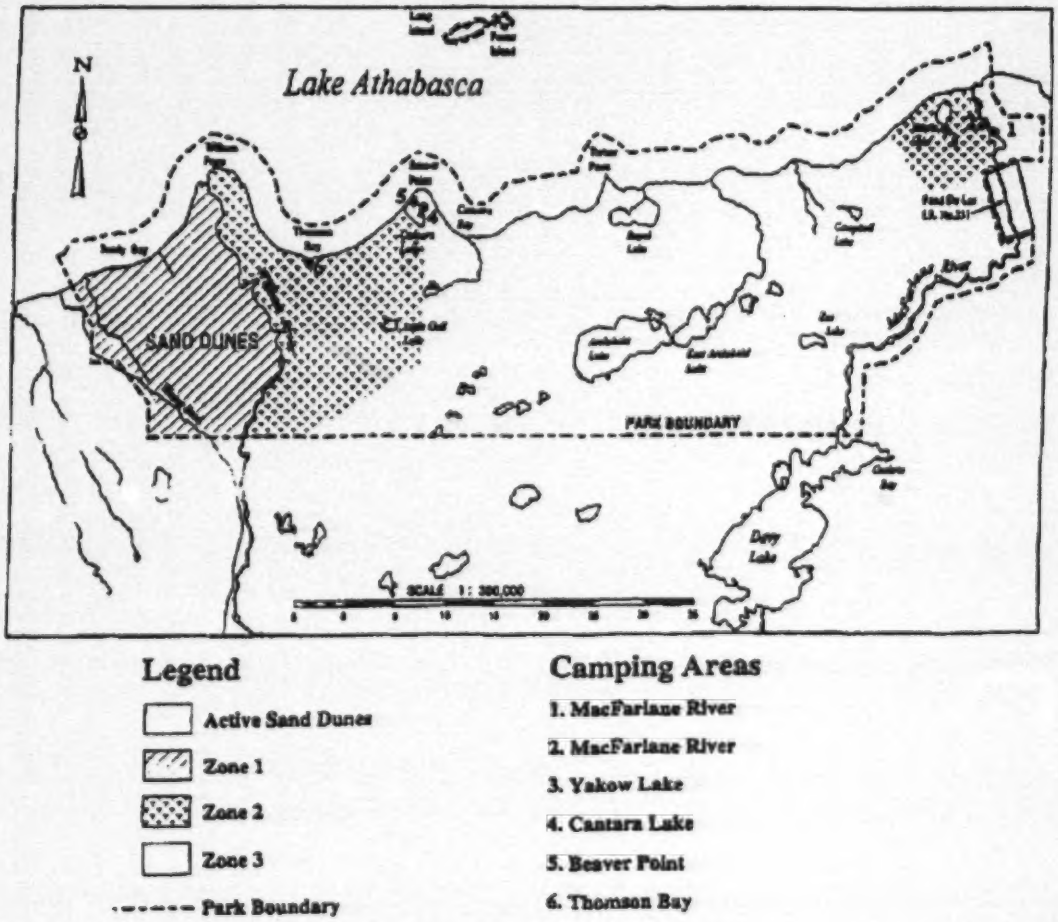

Figure 2. Map of the Lake Athabasca sand dunes and the limits of the Lake Athabasca Sand Dunes Wilderness Provincial Park.

Canadian range

This taxon is known only from the south shore of Lake Athabasca, Saskatchewan, where it occurs in the three large dune fields: (1) the William River Dunes located between Ennuyeuse Cr. and the William River, (2) the Thomson Bay Dunes located

between William River and Cantara Lake, and (3) the MacFarlane River Dunes, located just west of the MacFarlane River and in the smaller dunes at Archibald Lake (Figure 3).

Figure 3. Map of the distribution of *Armeria maritima* subsp. *interior* (based on Argus, 1981 and recent herbarium specimens).

HABITAT

Habitat requirements

Armeria maritima subsp. *interior* occurs primarily on gravel pavements within areas of active sand dunes. These gravel pavements originated through aeolian action on a sandy gravel till. As the sand was winnowed out of the till the surface became covered by a single layer of stones, a lag concentrate, that reduced erosion of sand from the till (Raup & Argus 1982). In time, the pavement stones were eroded sand polished by wind-blown sand into two- or three-faced ventifacts. This habitat is variously described on herbarium labels as gravel barrens, sandy-gravel barrens, or sandy till plains covered with ventifact gravel. This taxon is also known to grow in moist interdunal depressions; both west and east of the William River and south of Yakow Lake (herbarium specimens, Purdy 1995). Its cespitose growth form, however, does not adapt it to withstand burial by sand. As the dune slack is invaded by moving sand these plants will be buried. These populations, therefore, are relatively ephemeral but they may play an important role in survival of the subspecies as sources of seed.

Trends

There is no information on changes in quality or loss of this habitat but it is evidently very fragile. When the area was first visited in 1962 (Argus unpubl.) tracks of a light aircraft, which landed on an area of gravel pavement some 10 or more years

earlier, were still very evident. Disturbance of the gravel veneer could increase the rate of surface erosion.

Protection/ownership

All populations of this subspecies occur within the Athabasca Sand Dunes Wilderness Provincial Park.

BIOLOGY

General

Seedlings of *Armeria maritima* subsp. *interior* become established both on gravel pavements and on moist to wet dune slacks (Raup & Argus 1982, Purdy 1995). Because of its cespitose growth form large, old plants are found only on the relatively stable gravel pavements. Plants growing in dune slacks are young, vigorous plants (Purdy 1995), but these plants, inasmuch as they lack the capacity to grow up through sand, eventually will be buried by moving dunes. Further research on the biology of this endemic is needed.

POPULATION SIZES AND TRENDS

This subspecies occurs only as small populations or as occasional individuals. Gravel pavements, the main habitats, are themselves relatively uncommon and the vegetation on them is very sparse. Species growing on these gravel pavements, therefore, are among the least common species in the Athabasca sand dunes. This subspecies is thought to be one of the most uncommon of the endemics in the Athabasca sand dunes (Harms pers. comm.). There are eighteen herbarium collections of this taxon (Harms et al. 1992); of these, sixteen in Ottawa herbaria (National Herbarium of Canada or the Department of Agriculture Herbarium) were reexamined. The population of this subspecies is very small but its exact size and trends cannot be estimated without quantitative data. There is no evidence, however, to suggest that its numbers have diminished in recent years.

LIMITING FACTORS AND THREATS

Natural factors

Armeria maritima subsp. *interior* is limited by its small population size and restricted habitat.

Anthropogenic factors

Roads — When the 1981 COSEWIC report was written (Argus 1981), the proposed construction of a road from Cluff Lake to the south shore of Lake Athabasca would have opened the Athabasca dunes to human activity. The need for this road is likely to be replaced by a road from Points North to Black Lake. The Cluff Lake Road seems no longer to be an important limiting factor (Bihun pers. comm.).

Visitors — Tourists visiting the park and pleasure seekers from Uranium City, particularly those using ATVs, can have great impact on the sand dune ecosystem. At present there are about 200 people living in Uranium City. Feasibility studies are being done to evaluate the possibility of opening a gold mine in the Uranium City area (Bihun pers. comm.). The possibility of ATV traffic on the dunes, despite being banned from the park, is real. The regulations pertaining to the use of the park may be well-intentioned but are they enforceable? It is not known how easily the regulations can be changed to include such multiple use.

Tourism is increasing in the Lake Athabasca area. At present, the most important activity is fishing boat traffic from Ft. McMurray, Alberta; but few fishermen seem to venture onto the dunes. Ecotourism, however, is becoming attractive in northern Saskatchewan. Canoe trips on the Fond du Lac River to the sand dunes are becoming more common (a lecture on such a trip was presented to the Canadian Recreational Canoeing Association, Merrickville, Ontario, on 27 Nov. 1997). There are regulations designating camping sites and activities on the dunes. Because the dunes are not routinely monitored by Ministry personnel, the effectiveness of these regulations is unknown (Bihun pers. comm., Rogers pers. comm.).

Mining — Mining exploration is permitted up to the edge of the park. In the west, the edge of the park is the western edge of the William River dune field and in the east the MacFarlane River. Presently there is no buffer zone around the park (Bihun pers. comm., Rogers pers. comm.). The boundaries of the dune region, when it was designated a Protected Area, included a buffer zone. When the area became a Provincial Wilderness Park, however, the buffer zone was removed. If the area and its endemic flora are to be adequately protected a buffer zone must be reestablished.

Geophysical surveys, presumably for uranium ore bodies, were done in the region in 1997-1998. If and when mining becomes economically viable, mining could take place right up to the edge of the open dunes (Bihun pers. comm.). The impact on the dune habitat and its endemic flora from both mining activities themselves and the greatly increased recreational use of the dunes would be very great.

Other mining-related activities in the sand dunes include the collecting of seed for mine tailing reclamation. In order to stabilize extensive tailings resulting from the extraction of heavy oils from the Athabasca tar sands, SYNCRUD of Ft. McMurray, Alberta, is investigating the use of sand dune endemics (Purdy 1995, Bihun pers. comm.). Two firms, one from Alberta and one from Saskatchewan have already applied

for and collected seeds from the park (Purdy pers. comm.). Such activities in the sand dunes are incompatible with the protection of the habitat of endemic species.

The Athabasca sand dunes are not as remote and isolated as they once were. Pressures from mining, tourism, recreational use, and other commercial activities are rapidly increasing and likely to do so in the future. The protection of the unique endemic flora of the region will require the establishment of an adequate buffer zone around the park, enforceable regulations to limit access to its most sensitive regions, and adequate monitoring of the region by provincial conservation officers.

SPECIAL SIGNIFICANCE OF THE SPECIES

This subspecies is of interest because is an endemic that has evolved during the late Pleistocene glacial age somewhere in northwestern Canada or even locally along the south shore of Lake Athabasca subsequent to deglaciation. A variety of cultivars of this species are sold by nurseries because of the ease of their cultivation and use as an ornamental in rock gardens.

EXISTING PROTECTION OR OTHER STATUS

Armeria maritima subsp. *interior* was designated a threatened species by COSEWIC in 1981. In 1992 the sand dune region on the south shore of Lake Athabasca was officially designated the Athabasca Sand Dunes Wilderness Provincial Park (Anon 1997). The 1925 square kilometre park extends about 100 km along the south shore of the lake from just west of Ennuyeuse Creek to just east of the MacFarlane River and 20-30 km south of the lakeshore (Figure 2). The park has been zoned into three regions. The greatest protection is given to William River dune field (west of the William R.), lesser protection is given to dune fields in other areas. All regions have restrictions on camping, the number of individuals using a campsite, the use of open fires, collecting plants or ventifacts, and hiking on desert pavements (gravel pavements).

SUMMARY OF STATUS REPORT

Athabasca thrift (*Armeria maritima* subsp. *interior*) is one of ten endemic vascular plants known to occur in the Lake Athabasca sand dune region of northwestern Saskatchewan. It was assigned a status of threatened by COSEWIC in 1981 because of its rarity and specialized habitat that were then threatened by an all-weather road from Cluff Lake to the south shore of Lake Athabasca. It is one of the most uncommon endemics in the Athabasca sand dunes. Its habitat is localized and fragile. Although the Athabasca sand dunes enjoy Provincial Wilderness Park protection there is reason to believe that pressures from mining and tourism will require continued vigilance.

TECHNICAL SUMMARY

Armeria maritima* ssp. *interior
Athabasca thrift — Arméria de l'Athabasca
Occurrence: Saskatchewan

Extent and Area information	
• *extent of occurrence (EO)(km²)*	<2000 km²
◦ *specify trend (decline, stable, increasing, unknown)*	Stable
◦ *are there extreme fluctuations in EO (> 1 order of magnitude)?*	No
• *area of occupancy (AO) (km²)*	likely <<500 km² but >20 km²
◦ *specify trend (decline, stable, increasing, unknown)*	likely stable
◦ *are there extreme fluctuations in AO (> 1 order magnitude)?*	No
• *number of extant locations*	18 collections
◦ *specify trend in # locations (decline, stable, increasing, unknown)*	Unknown
◦ *are there extreme fluctuations in # locations (>1 order of magnitude)?*	not likely
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	likely stable
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	perhaps 2-3 yrs (life span is about 3-5 yrs)
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	Unknown
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	unknown trend but likely stable
◦ *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	
◦ *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	not likely
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	found in 3 sand dune areas but mainly restricted there to gravel barrens habitats and dune slacks
◦ *list each population and the number of mature individuals in each*	unknown population size
◦ *specify trend in number of populations (decline, stable, increasing, unknown)*	unknown but likely stable
◦ *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	not likely
Threats	
- limited threats from visitor use of the park, especially through ATV activity	
Rescue Effect (immigration from an outside source)	none (endemic)
• *does species exist elsewhere (in Canada or outside)?*	
◦ *status of the outside population(s)?*	
◦ *is immigration known or possible?*	
◦ *would immigrants be adapted to survive here?*	
◦ *is there sufficient habitat for immigrants here?*	
Quantitative Analysis	

ACKNOWLEDGEMENTS

George Bihun, Conservation Officer, Saskatchewan Environment and Resources Management, Stony Rapids, Saskatchewan, provided important insights based on his personal experience in the Athabasca sand dunes and specific comments on limiting factors.

C.C. Chinnappa, University of Calgary, Calgary, Alberta, provided an update on current botanical activities in the Athabasca sand dunes.

Vernon L. Harms, University of Saskatchewan, Saskatoon, Saskatchewan, provided very useful information on species status in the Athabasca sand dunes.

Sheila Lamont, Botanist, Saskatchewan Conservation Data Centre, Regina, Saskatchewan, put me into contact with knowledgeable individuals.

Bret G. Purdy, Inter-Theme Research Coordinator, Sustainable Forest Management Network, University of Alberta, Edmonton, provided me with information on current research and economic activities in the Athabasca sand dunes.

Kay Rogers, Ottawa, Ontario, visitor to the Athabasca Sand Dune region in 1997.

Earl Wiltse, Provincial Endangered Wildlife Specialist, Saskatchewan Environment and Resource Management, Regina, Saskatchewan, provided names of knowledgeable individuals.

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THE AUTHOR

George W. Argus received a PhD in Biology from Harvard University in 1961. He worked as a professor at the University of Saskatchewan from 1961-1969 and a curator at the Canadian Museum of Nature from 1972-1995. He retired in 1995 as Curator Emeritus. He is a specialist in the systematics of the genus *Salix* (willow) and has written monographs and floristic treatments on the genus. In 1973 he initiated and directed the Rare and Endangered Plants Project which published on rare plants in Canada, including Rare vascular plants in Canada - Our natural heritage. In the past he has served as scientific authority for flora to the Convention on International Trade in Endangered Species and as a member of various conservation committees. Currently

he is a member of the editorial committee of the Flora of North America and is writing a monograph on the systematics of New World *Salix*. His research in systematics has been recognized by the Gleason Award from the New York Botanical Garden and his conservation-related work received the Lawson Medal from the Canadian Botanical Association.

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